



Beryllium Exposures During DOE D&D Activities

**Beryllium Health & Safety
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Biography

- **Scott Seydel is currently employed as a Senior Industrial Hygienist by CH2M HILL Plateau Remediation Company. He was a member of the development team for the Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP) and is currently the chair of the Hanford Site CBDPP Committee. Prior to his current job, Scott was the manager of Fluor Hanford's Industrial Hygiene and Chemical Management programs. Scott is a Certified Industrial Hygienist and is a professional member of the American Society of Safety Engineers. Scott has 20 years of environmental, health, and safety experience in a variety of industries, including environmental remediation, semiconductor fabrication, and aircraft manufacturing.**

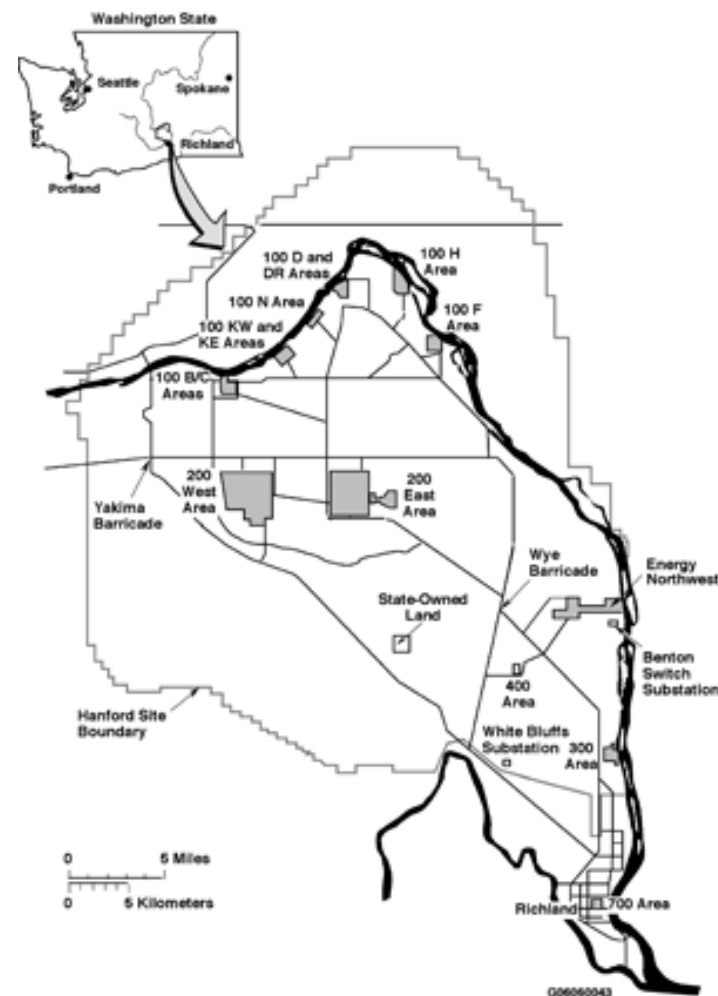
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Beryllium at Hanford

- Limited current beryllium mission activities
- Beryllium legacy contamination
 - Fuel production in 300 Area
 - Rocky Flats ash/oxide
 - Beryllium alloy components
- 1200 active buildings
- 350 inactive buildings
- Incomplete Be usage data is a problem



D&D vs. Operations

Operations

- Fixed location
 - Known contaminant sources
 - Stable work evolutions
 - Routine use of engineering controls
- D&D
 - Multiple locations
 - Limited history of contaminant sources
 - Dynamic work evolutions
 - Limited ability to use engineering controls



Regulatory Requirement

10CFR 850.20(a)

The responsible employer must develop a baseline inventory of the locations of beryllium operations and other locations of potential beryllium contamination, and identify the workers exposed or potentially exposed to beryllium at those locations.



Possible Approach #1

- **Treat beryllium in manner similar to asbestos**
- **Challenge – Don't have the characterization and clearance protocols specified in the regulations that exist with beryllium**



Possible Approach #2

- Treat beryllium in a manner similar to radiological contamination
- Challenge – Don't have the beryllium equivalent of the 600+ Radiation Control Technicians present on site



Possible Approach #3

- Treat beryllium in a manner similar to lead and other toxic metals
- Challenge – Beryllium has several significant differences from other toxic metals



The Key Question

- At what point is beryllium contamination a concern?
 - 0.1 % beryllium
 - 3 ug/100 cm²
 - 0.2 ug/100 cm²



Other Important Questions

- When do I need to sample?
- How many samples are necessary?
- If surface contamination is found, what work should be considered to have the potential for exposure?



Baseline Beryllium Inventory

- **Initial assessment of all facilities**
 - Record reviews
 - Employee interviews
 - Prior sampling results
- **Three categories of facilities**
 - Beryllium Clean
 - Beryllium Controlled
 - Status TBD (characterization sampling required)



Characterization of Facilities

- **Sampling process based on MARSSIM**
 - At least 10 samples per survey unit
 - Sampling of areas of suspected contamination
 - Random samples of remaining area
- **Wipe samples for relatively clean surfaces**
 - 0.2 ug/100 cm² as standard
- **Bulk samples for dirty surfaces**
 - 2 ug/g as standard for bulk samples

Facility Types

- **Facility Awaiting Characterization**
 - Interim controls apply
- **Beryllium Clean Facility**
 - Determined by process knowledge or characterization sampling
- **Beryllium Controlled Facility**
 - **Beryllium Controlled Area**
 - Potential for surface contamination above background
 - **Beryllium Regulated Area**
 - Potential to exceed action level

Facility Breakdown

- **83 Facilities Awaiting Characterization**
- **20 Beryllium Controlled Facilities**
 - 6 BCF's based on characterization data
- **18 BCF's that have been demolished**



Exposures in BCF's

- **Non-intrusive activities (walkdowns, zero energy verifications, etc.)**
 - No measurable airborne exposures documented
- **Material removal (ripping & stripping)**
 - Measurable employee exposures routinely documented
 - Several employee exposures above the action level documented
- **Building demolition**
 - Minimal number of measurable employee exposures
 - No employee exposures near or above the action level

Control of High Rad Areas

- Hanford has highly rad contaminated buildings that can't be easily characterized for beryllium
- The rad controls sets are almost identical to those used for beryllium
- Declaring these areas as Beryllium Controlled Areas seems simple, but:
 - Training
 - Employee restrictions
 - Labeling of items leaving area

What About

- Fly ash and bottom ash in the old coal fired plants?
- Electrical switchgear components?
- Overhead crane brake assemblies?
- Damaged waste boxes containing potentially Be contaminated waste?

